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Spectrum of Fungal Isolates of Clinical Specimens from a Tertiary Care Hospital of North India

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Abstract: ***Background: Fungal infections are emerging as an important cause of morbidity and mortality in critical patients. It is important to know the local etiology of fungal infections, because they show large number of variation depending upon climatic or Geographical conditions for proper management of fungal infections. Aim of Study: This study was planned with an aim to study local fungal profile of various clinical specimens received in our Medical College Hospital. Setting and design: Descriptive observational study. Material and Method: Study is conducted at Dr RPGMC Tanda (Kangra) H.P which is a tertiary care hospital. Samples were taken between october2016-17. Total 212 samples were included in the study. Fungal isolates were identified and documented. Results: Most common specimen was skin scrapping and isolate was Trichophyton 69.56% followed by sporothrix, Aspergillus and Fonsecaea. Among Trichophyton most common species were T tonsurans, mentagrophytes and T rubrum. Trichosporon followed by Fonsecaea were isolated from pus/aspirates. Non albicans candida were common as compared to Candida albicans. More fungal infections were found in Males56.7% and in age group of 21-50 (66%). Conclusion: There is variation in etiology of fungal infections depending upon the climatic as well as geographical conditions. It is important to know the local etiology for proper management of fungal infections.***

Keywords: Fungal profile, dermatophyte, slide culture, CMA, Yeasts, SDA

1. Introduction

Fungal infections have emerged as a worldwide healthcare problem in recent years [1] owing to extensive use of broad spectrum antibiotics [2] long term use of immunosuppressive agents, increased use of hyper alimination and indwelling devices [3] and increasing population of terminally ill , debilitated and immunocompromised patients [4].

In past fungi were considered to be merely non pathogenic agents or simply lab contaminants have now proved to be significant pathogens and are encountered as emerging agents of significant fungal diseases. There is an emergence and re-emergence of different types of fungal diseases of paramount significance which are caused by saccharomyces cerevisiae, candida dubliensis, scedosporium, apiosporum, penicillium marneffei and fusarium sps. Some of fungi, which have been reported as merely environmental contaminants have now emerged as significant human pathogens e.g. apophysomyces elegans and Saksenaea vasiformis may lead to fatal consequences even in immunocompetent individuals. [5].

Candida and Aspergillus species are the most common causes of fungal infection but other yeasts and filamentous fungi are emerging as pathogens. Among the filamentous fungi, apart from Aspergillus spp, others like Fusarium spp., Scedosporium spp., Penicillium spp. and Zygomycetes are becoming increasingly common (6, 7). Although C. albicans is the most prevalent species involved in causing fungal infections, the incidence of infections due to non-albicans species is increasing particularly in patients treated in the intensive care unit (8).

Though several reports on fungal profile are available from different parts of country. The local patterns of fungal isolates from clinical specimen may change with time and geographical area and it is important to be familiar with recent local trends in order to improve diagnosis. The present study was undertaken with a view to find local patterns of fungal isolates from various clinical samples received at our tertiary care hospital between period october2016-oct 2017.

2. Material and Methods

The study was conducted at department of Microbiology Dr RPGMC Tanda (Kangra) a tertiary care hospital. The samples were collected from the patients suspected to have fungal infections during period from October2016-oct2017. These fungal isolates were from various clinical specimens, which included skin scraping, sputum, pus, aspirates, bonemarrow, corneal scraping, and nail scrapings. Total 212 samples were included in this study.

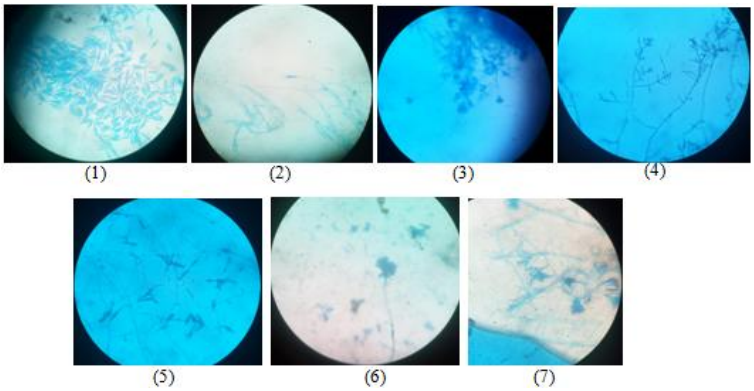
All samples were analyzed by direct microscopy and culture as per standard microbiological procedures. For direct microscopy, 10% potassium hydroxide (KOH) was used to visualize presence of any fungal element. For yeasts, Gram's staining was done. For fungal culture, all samples were inoculated on two isolation media: one in Sabouraud's dextrose agar (SDA) and the other in SDA with chloramphenicol (0.05mg/ml, 0.5mg/ml chilorehexidine) in duplicate. The culture tubes were incubated at 25 ºC and 37 ºC and examined daily for six weeks. All clinical specimens were collected under appropriate clinical guidelines and proper criteria were maintained during the transportation of specimen. Identification was based on various methods including LCB mount, slide culture, Gram staining, germtube test, dalmau method and by using CHROMEagar, DTM and biochemical tests.

The identification of fungi was done by macroscopic and microscopic evaluation of the fungal morphology. The fungus were identified by observing texture, colour, growth

rates, mycelium and conidium types, Micro culture on slides technique was used for observation of filamentous fungi. The yeast isolates were identified by standard tests like Gram stain, Germtube test, Dalmau method and urease production.

3. Results

Various clinical samples were received in the department of microbiology in our hospital. Total 212 samples were included in the study received between October 2016-17.Maximum number of samples were skin scrapings which is 154 out of which 92 samples were positive (59.74%) Trichophyton is the most commonly isolated dermatophyte (64/92) and microsporum is also isolated from one sample second most commonly found isolates were sporothrix (6/92), Fonsaecea (3/92) Aspergillus (5/92). Trichopyton tonsurans, T. rubrum, T. mentagrophyte were the most commonly isolated species among dermatophyte. Scopulariopsis, Aspergillus, and dermatophytes isolated from nail scappings.



Photomicrograph

Slide culture mount of various fungal isolates

1) Fusarium sps
2) Paecilomyces
3) Penicillium
4) Fonsecaea
5) Microsporum sps
6) Aspergillus
7) Scopulariopsis

From pus/aspirates most commonly isolated fungus were trichosporon, Fonsecaea and paecilomyces. From sputum samples non albicans candida followed by candida albicans. We could not obtain any pathogenic fungi from corneal scaping and bone marrow except saprophytic fungi during this period of study. Male were more affected 56.07% and fungi infections were found more in age group 21-50 i.e 66%.

Table 1: Fungal spectrum of various specimens

S.No.	Fungal Isolate	Skin	Corneal	Pus/ Aspirate	Sputum	Nail	Bone Marrow
1	*Candida albican*	1	-	-	2	-	-
2	*C. glabrata*	3	-	-	-	-	-
3	Noncandida	2	-	-	1	-	-
4	Sporothrix	6	-	-	-	-	-
5	Aspergillus	5	-	-	-	1	-
6	Fonsecaea	3	-	2	-	-	-
7	Trichophyton	64	-	-	-	1	-
8	Microsporum	1	-	-	-	-	-
9	Scedosporium	1	-	-	-	-	-
10	Acremonium	1	-	-	-	-	-
11	Cladosporium	1	-	-	-	-	-
12	Rhodotorula	2	-	-	-	-	-
13	Trichosporum	-	-	3	-	-	-
14	Paecilomyces	2	-	1	-	-	-
15	Scopulariopsis	-	-	-	-	1	-
16	Sterile mycelia	-	1	-	-	-	-
17	Saprophytic	-	-	-	-	-	2

Table 2: Age-wise positivity

S.No.	Age Group (Years)	Positive (No.)
1	<20	19
2	21-50	66
3	51-70	15
4	>70	7

Total Sample (n) = 212

Table 3: Gender-wise positivity

S.No.	Gender	Positive (No.)	% positive
1	Male	60	56.07
2	Female	47	43.92
		107	50.47

Table 4: Prevalence of fungi in various clinical specimens

S.No.	Type of Specimen	Total Samples	Positive	% positive	% negative
1	Skin Scrapping	154	92	59.74	40.26
2	Corneal Scrapping	15	1	6.6	93.40
3	Pus/ Aspirates	31	6	19.35	80.65
4	Sputum	7	3	42.85	57.15
5	Nail Scrapping	2	2	100	0
6	Bone Marrow	3	2	66.66	33.34

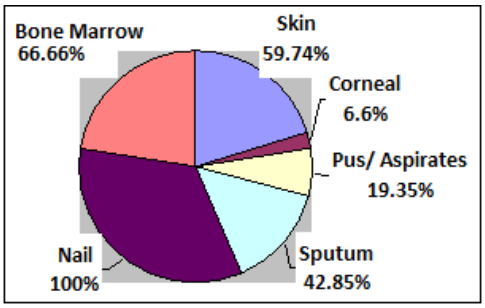


Figure 1: Distribution of various clinical samples obtained from patients infected to have fungal infection

4. Discussion

Fungi are ubiquitious and in recent past years incidence of fungal infection has been increased. These fungi are a leading cause of morbidity and mortality in cancer, burn, and surgical patients as well as neonatal intensive care units.

Following studies from different regions of India; Singh & Beena (1999-2000), Belurkar & Bharmal (2001-2002), Peerapur & Inamdar (2003), Das & Goyal (2005), Jain & Sharma (2008) showed *Trichophyton rubrum* was the most commonly iso-lated dermatophyte. (9).

Another recent study from north India reported that the most common fungal isolates in onychomycosis were dermatophytes (49.5%), followed by Candida spp. (40.4%) and nondermatophyte molds (10.1%) [10]. In another study candida species accounted for 34/94 (36%) {candida albicans-16; non albicans candida-18} of fungal nail infections (11)

In another study various isolates from nail infection were *Trichophyton species* 35 (43.75%), followed by *Candida species* 18 (22.5%), *Aspergillus species* 16 (20%), *Curvularia* and *Epidermatophyton species* 4 (5%), *Alternaria*, *Fusarium* and *Penicillium species* one (1.25%) [12]. The major isolates from onychomycosis in another study, *Aspergillus niger* 8 (34.78%), followed by *Rhizopus species* 3 (13.04%), *Aspergillus flavus*, *Aspergillus nidulans* and *Epidermatophyton floccosum* 2 (8.70%), *Aspergillus terreus*, *Aspergillus species*, *Mucor species*, *Penicillium species*, *Curvularia* and *candida species* one (13).

Superficial fungal infection occurs mainly in younger age group and adults. In this study males were more affected than females. Most common clinically diagnosed cases in superficial fungal infection of skin were of *Tinea corporis*, *T. pedis* and *T. cruris*. Among dermatophytes, *T. rubrum* was the commonest etiological agent followed by *T. mentagrophytes*. Amongst the non-dermatophyte moulds, *Aspergillus spp*. was the most prevalent species. (9). Simillarly in our study males were more affected group i.e 56.07%and fungal infection was found more in age group21-50 i.e 66%.Among dermatophytes trichophyton was found most commonly isolated fungus in skin infections but T. Tonsurans was commentest species followed by rubrum and mentagrophytes. Second most commonly isolated fungus were sporothrix, fonsecaea and aspergillus in contrary to other studies. Nonalbican candida were common isolate from sputum samples. Aspergillus, dermatophytes and scopurapsosis were isolated from nail scrapings.

5. Conclusion

There are distinct pattern of regional variation in the etiology of fungal infections. So it is essential to detect them early which can help clinicians to start empirical antifungal therapy immediately for better management of the patients.

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